

## Biology Holiday Homework

*Day-Wise from Day 1 to Day 20*

*With Questions and Diagrams.*

BYJU'S

## Day - 1

### 1. Design an activity to prove that chlorophyll is necessary for photosynthesis.

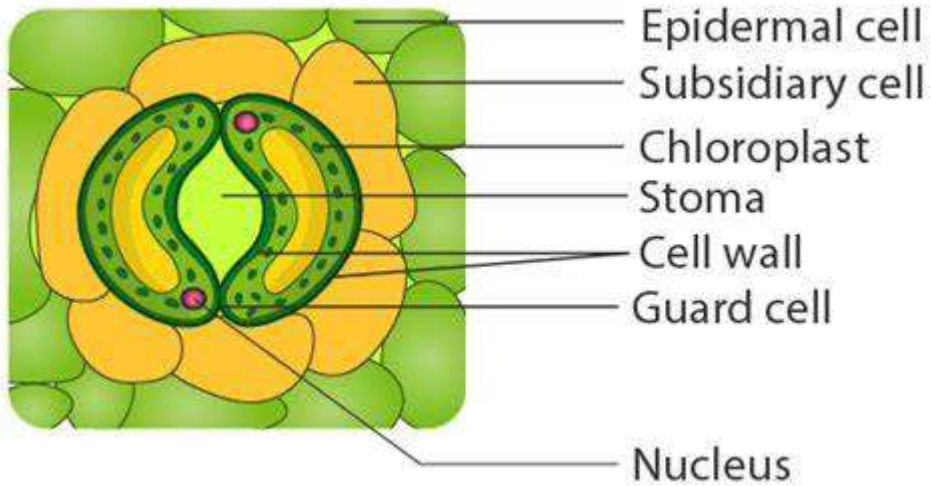
**Procedure:** Destarch a variegated potted plant in darkness for three days. Cover a portion of a green leaf with black paper. Expose the plant to sunlight for six hours. Remove the paper, boil the leaf in alcohol to remove chlorophyll, then rinse and test with iodine solution.

**Observation:** The green parts of the leaf (exposed to light) and the uncovered green part of the variegated leaf turn blue-black, indicating starch presence. The non-green parts and the covered green part remain brown, showing no starch.

**Conclusion:** This demonstrates that photosynthesis (starch production) only occurs in the presence of chlorophyll and light, proving chlorophyll's essential role.

## Day - 2

2. Draw a labelled diagram to show a 'Stomatal Apparatus'.



## Day - 3

### 3. Design an activity to show that $\text{CO}_2$ is necessary for Photosynthesis.

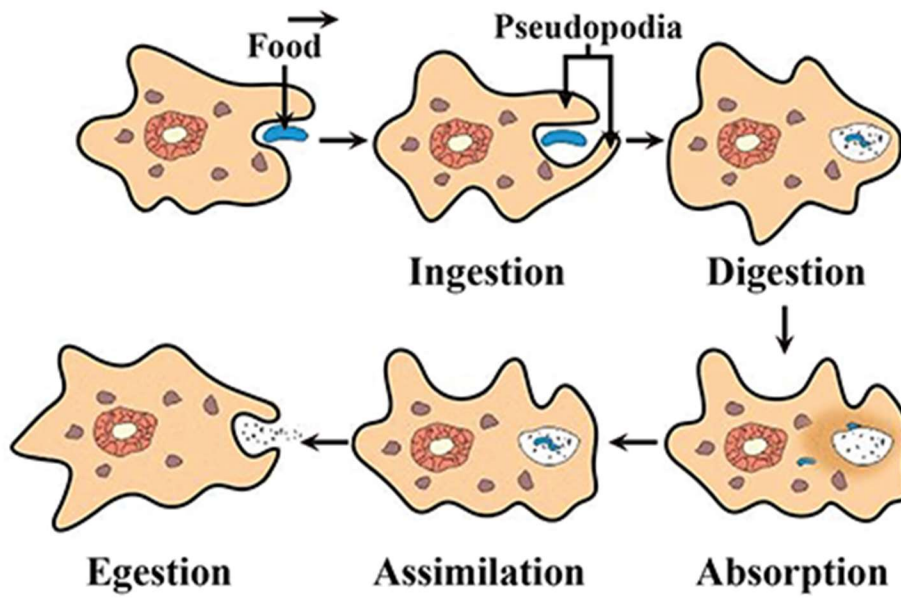
**Procedure:** Take two similar potted plants, destarched for three days. Place each on a glass plate. Under one bell jar (Plant A), place a watch glass with potassium hydroxide (KOH) to absorb  $\text{CO}_2$ . Under the other (Plant B), place an empty watch glass. Seal both bell jars at the base with Vaseline. Place in sunlight for two hours, then test a leaf from each plant for starch.

**Observation:** The leaf from Plant A (with KOH) will not show starch (no blue-black color), while the leaf from Plant B (without KOH) will test positive for starch (turns blue-black).

**Conclusion:** Plant A, deprived of carbon dioxide, could not photosynthesize, thereby proving that  $\text{CO}_2$  is a crucial requirement for photosynthesis to occur.

## Day - 4

4. Draw a labelled flow diagram to show Nutrition in Amoeba.



## Day - 5

### 5. Differentiate between Parasitic, Saprotrophic and Holozoic nutrition.

Answer:

***Parasitic nutrition:*** Organisms obtain food from living hosts, causing them harm but usually not killing them immediately (e.g., *Cuscuta* on plants).

***Saprotrophic nutrition:*** Organisms derive nutrients from dead and decaying organic matter by external digestion (e.g., fungi, bacteria).

***Holozoic nutrition:*** Organisms ingest complex organic food materials, which are then digested internally and absorbed (e.g., humans, *Amoeba*).

## Day - 6

### 6. With the use of lime water. How can you prove that $\text{CO}_2$ is exhaled by us?

**Procedure:** Obtain a clean test tube and fill it with freshly prepared, clear limewater (calcium hydroxide solution). Carefully exhale air through a straw into the limewater, ensuring the straw reaches below the liquid surface.

**Observation:** The initially clear limewater will rapidly turn milky or cloudy. This milky appearance is due to the formation of insoluble calcium carbonate.

**Conclusion:** Since limewater turns milky specifically in the presence of carbon dioxide, this activity clearly demonstrates that the air exhaled during human respiration contains carbon dioxide.

## Day - 7

### **7. What are the Energy Currency of Cell? How do they release energy? How much energy is released by its breakdown?**

Answer: Adenosine Triphosphate (ATP) is the energy currency of the cell. Energy is stored in its high-energy phosphate bonds. When the terminal phosphate bond is broken through hydrolysis, ATP converts to ADP (Adenosine Diphosphate) and inorganic phosphate. This releases a significant amount of energy, approximately 30.5 kJ per mole, which powers various cellular activities.



## Day - 8

### 8. Write the functions of R.B.C, W.B.C and Platelets.

Answer:

**RBC (Red Blood Cells):** Primarily responsible for oxygen transport throughout the body. They contain hemoglobin, a protein that binds reversibly with oxygen.

**WBC (White Blood Cells):** Form a vital part of the immune system. They defend the body against pathogens, foreign invaders, and abnormal cells.

**Platelets:** Essential for blood clotting (coagulation) upon injury to stop blood loss.

## Day - 9

### 9. Design an activity to show, in transpiration water vapour is released by plants.

**Procedure:** Take a healthy potted plant and water it adequately. Enclose the entire plant, including the pot but not the soil, in a transparent polythene bag. Tie the mouth of the bag securely around the base of the stem to prevent moisture evaporation from the soil. Place the setup in sunlight for a few hours.

**Observation:** After some time, small water droplets will be observed forming on the inner surface of the polythene bag, which may eventually coalesce to form larger drops.

**Conclusion:** The presence of water droplets inside the bag indicates that the plant released water vapor through its leaves (transpiration), which then condensed upon cooling inside the enclosed environment.

## Day - 10

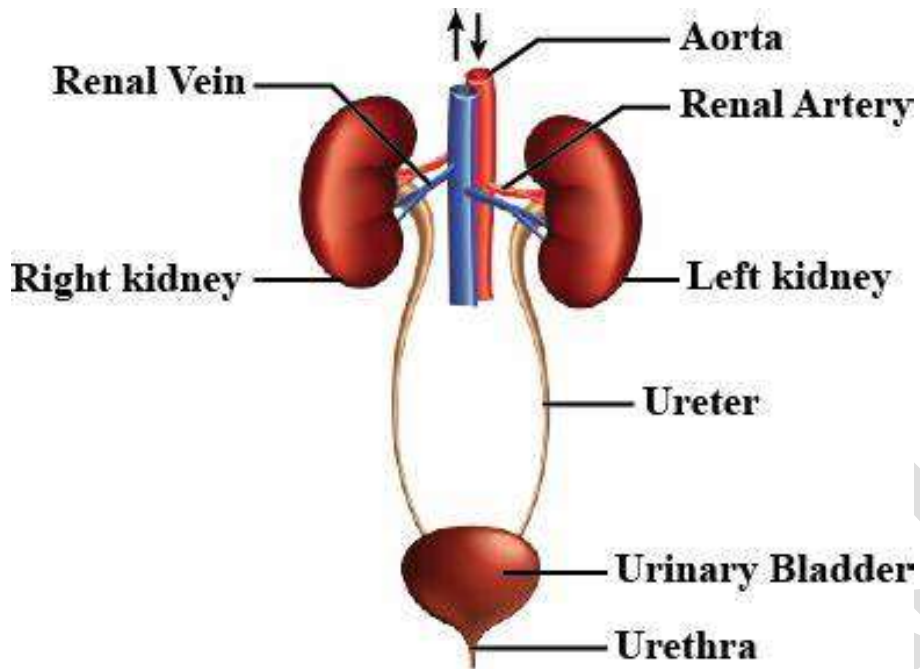
### 10. Explain the process of Haemodialysis.

Answer: Haemodialysis is a life-sustaining medical procedure used when a person's kidneys fail to filter waste products from the blood. In this process, the patient's blood is pumped out of the body and circulated through an artificial kidney machine (dialyser). The dialyser's semi-permeable membrane allows waste products to diffuse from the blood into dialysis fluid, while purified blood is returned to the patient, mimicking kidney function.

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## Day - 11

11. Draw a neat and labelled diagram of 'Human excretory system'.



## Day - 12

**12. The leaflets of 'Touch me not' plant droops down if one of the leaflets is touched. Why?**

Answer: The 'Touch-me-not' plant (*Mimosa pudica*) exhibits rapid thigmonasty. This response is due to specialized cells at the base of its leaflets, called pulvini, which contain large water-filled vacuoles. Upon touch, these cells rapidly lose water, causing a sudden decrease in turgor pressure. This loss makes the leaflets and petioles collapse or droop downwards, serving as a protective mechanism.

## Day - 13

**13. What are tropic movements? List down the various Tropic movements in plant parts with examples.**

Answer: Tropic movements are directional growth responses of plant parts towards or away from an external stimulus. These are typically slow, irreversible growth movements.

**Examples include:** Phototropism (shoots towards light), Geotropism (roots downwards, shoots upwards), Hydrotropism (roots towards water), Chemotropism (pollen tube to ovule), and Thigmotropism (tendrils coiling).

## Day - 14

### 14. List down the functions of various plant hormones.

Answer: Auxins promote cell elongation and root growth. Gibberellins stimulate stem elongation and seed germination. Cytokinins promote cell division and delay aging. Absciscic acid (ABA) inhibits growth and causes dormancy. Ethylene promotes fruit ripening and senescence. These hormones regulate plant growth, development, and responses to environmental cues.

## Day - 15

### 15. Design an activity to show Phototropism in plants parts.

**Procedure:** Take a conical flask with water and place a germinated seedling in its neck, secured with cotton. Place this flask inside a cardboard box that has a small opening cut out on one side. Position the box near a window or light source, ensuring light enters only through the opening.

**Observation:** After a few days, observe the seedling. The shoot (stem) of the seedling will be seen bending distinctly towards the small opening from which light is entering the box.

**Conclusion:** This bending of the plant shoot towards the light source clearly demonstrates phototropism, which is the plant's directional growth response to light.



## Day - 16

### 16. Design an activity to show geotropism in plant parts.

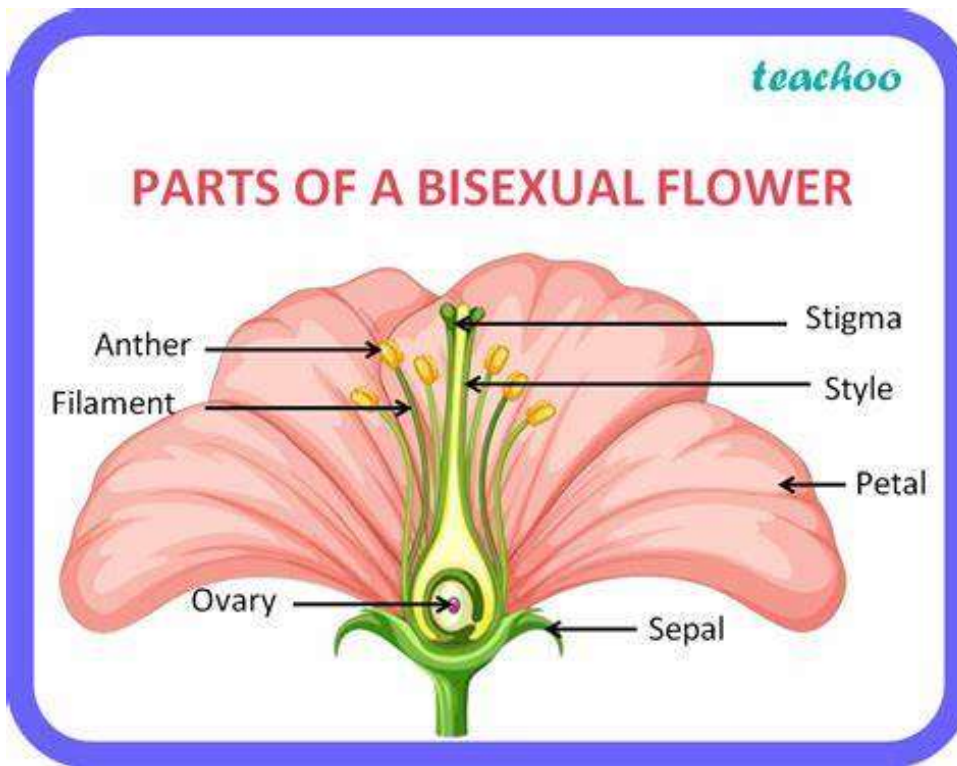
**Procedure:** Take a germinating seedling with clearly visible root and shoot. Place it horizontally on a moist cotton pad inside a transparent glass tube or a petri dish. Secure the seedling gently so it remains in a fixed horizontal position. Keep the setup in a dark place to eliminate light as a directional stimulus.

**Observation:** Over the next few days, observe the growth pattern. The radicle (root) will be seen bending downwards, growing into the moist cotton pad. The plumule (shoot) will curve and grow upwards, against the direction of gravity.

**Conclusion:** This experiment demonstrates geotropism: roots exhibit positive geotropism (grow towards gravity), while shoots exhibit negative geotropism (grow away from gravity).

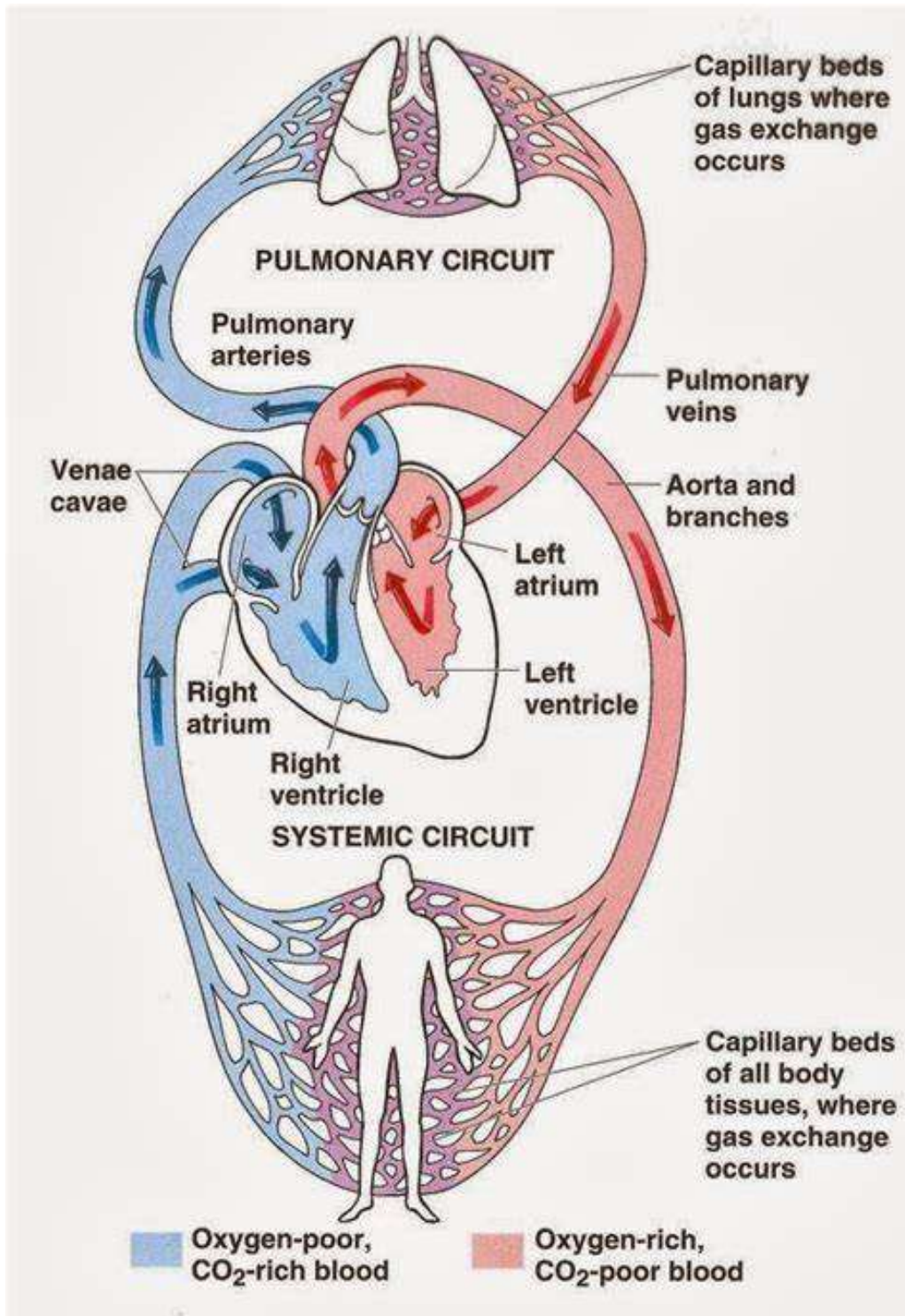
## Day - 17

17. With a labelled diagram, show the various parts of a Bisexual flower.



## Day - 18

18. Draw a Schematic diagram to show the route of Blood circulation in Humans.



## Day - 19

### 19. How can we check the Blood pressure? Explain

Answer: Blood pressure is typically measured using a sphygmomanometer and a stethoscope. A cuff is wrapped around the upper arm and inflated until blood flow is restricted. As it slowly deflates, the first sound heard (systolic pressure) indicates the heart's contraction phase. The point where the sound disappears (diastolic pressure) indicates the heart's relaxation phase, providing two key readings for cardiovascular health.

**(OPTIONAL)**

**Day-20**

**20. Do you see your future in the fascinating world of 'Biology'? If 'yes', 'why'? If 'No', 'Why not'?**

Answer: Absolutely not. While others are busy drawing leaves and memorizing cell parts, I'm aiming for IIT—where real legends are forged. I don't have time to chase frogs or stare into microscopes. My battlefield is logic, tech, and innovation. Biology is fascinating, no doubt—but I'm not here to study life, I'm here to engineer the future.